The Files - RD-72, Schedule C 30 April 1959

25X1A9a [redacted]

Status Report - RS-18 Engineering/Operational Field Tests

1. On 23 and 25 April 1959, RS-18 test transmissions were made 25X1A6a from [redacted] into the base station at [redacted] The follow- 25X1A6b ing persons were involved in these tests:

25X1A9a [redacted] C-E at [redacted] (field) 25X1A6a

C-T OC-E at [redacted] (base) 25X1A6b

2. Two field sets were tested in the field. Prior to leaving Washington the two sets were tested back-to-back with the base station. Both sets worked well with adequate power output. The test site was located in a relatively noise free area. Transmissions were made from a clear site with a complete ground radial system and also from the top of a 40-foot tower. Both long wire and whip shots were made. The base station used two rhombics on 278° while the field location was at 235°. In all 23 shots were made from the field sets. Transmissions were made on each of the 6 channels. Of the 23 shots, three were heard by the base station but there was no recognition and consequently nothing recorded. Two shots, one from each field set, were recognized by the base station and recorded. The recorded tapes were reasonably good. All operating conditions at the field end were good. However, there was no way to monitor the radiated power. The sets were tuned for an indicated maximum on the antenna tuner meter after care had been taken to adjust the antenna to the proper length. The batteries were fully charged. No more than 14 shots were made with one battery. Upon return to Washington the field sets were again tested back-to-back with the base station. One set operated well. The second set, No. 718, was found to have a defective exciter-modulator unit. However, in the field the last good transmission was made with this set. If the modulator unit broke down at this point the six shots made after this would have failed. In the back-to-back tests conducted after the field trip the modulator unit in the second set, No. 718, was peplaced with a good modulator unit. The power output reading then was normal, as were those of the first unit. Both No. 716 and 718 receivers were checked and found to be operating correctly. On the field trip one receiver appeared inoperative on 3 channels. A rather disquieting feature of the antenna tuner was discovered upon return to Washington which would account for the lack of success with the RS-18 field sets. There are two positions

of the tunable coil (variometer- this inductance cancels out the X_c of a capacitive antenna) at which a false indication of tuning may be encountered. The false tune-up is indicated by a sharp rise to a maximum and a sharp decline of the meter. A true tuning indication is one that builds up slowly and falls off slowly. The variometer is actually a split coil and the two points at the split represent almost an open circuit. Only minor power is radiated with a false tune-up. This bad feature was not known on the field trip. Each field set antenna tune-up was made for a maximum reading only. For each shot made from the field with the meter reading at maximum nothing was heard at the base end. It was also demonstrated that the receiver operation can be affected by this tuning procedure. In spite of the test results, this equipment, when working properly, out-performs the RS-16 equipment in many ways.

3. As a result of this field test, I recommend the following:

   a. Return all antenna tuners to the contractor to eliminate the effect of the gap in the variometer - possibly by shorting the meter out at these points or bridging the inductance; also provide for an output power indication on the meter.

   b. A further series of tests, about 25 May 1959, from [redacted] 25X1A
   This would also be an opportunity to test the RS-16B and RS-16C.

   c. Fabrication of a small absorption meter as standard equipment for all field tests, RS-18, RS-16, etc., to measure relative radiated power from 3 to 30 mc.

For future RS-18 field equipment I recommend that:

   a. The transmitter stages before the final amplifier be transistorized. The final stage would then be the only tube in the RS-18 field set.

   b. Step (a) would permit packaging the antenna tuner within the transmitter module. A small signal for tune-up could be derived from some stage ahead of the final amplifier. A pi-type network for matching should replace the variometer.

   c. The connector cable be replaced by recessed connectors (similar to the AS-3). Each module would plug into another.

   d. The coder be studied and reworked to increase its reliability. 100% copy is not guaranteed by the contractor with the present coder.

   e. The receiver bandswitch be made more reliable.

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